

Name _____

STUDY GUIDE: Final

Chapter 1: Intro

1. A good experiment should have:
 - A testable _____ (possible answer to a scientifically testable question)
 - Detailed qualitative and/or quantitative _____
 - An experimental group and a _____ group
 - How many variables being changed at one time? _____
2. _____ observations are descriptive characteristics while _____ observations are numbers obtained through counting or measuring.
3. The relatively constant internal physical and chemical conditions maintained by organisms are referred to as _____.
4. What are the 8 criteria that all living things must meet?
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 6. _____
 7. _____
 8. _____

Chapter 2: Chemistry of Life

5. _____ have a positive charge, _____ have a negative charge, and _____ are neutral with no charge. _____ and _____ are found in the nucleus of an atom. A neutral atom has the same number of _____ and _____.
6. In a covalent bond, electrons are _____ between atoms. In an ionic bond, electrons are _____ from one atom to another. Attractions between hydrogen atoms and other atoms are called _____ bonds, which are _____ than covalent or ionic bonds.
7. Oxygen, carbon dioxide, and water are examples of _____ compounds because they do NOT contain _____ chains. Carbohydrates, lipids, proteins, and nucleic acids are examples of _____ compounds because they DO contain _____ chains.
8. _____ is the attraction between molecules of different substances. _____ is the attraction between molecules of the same substance. _____ is the amount of heat energy required to increase temperature (water's is very high!).
9. Monomers are joined to form polymers by _____, which forms bonds through the _____ of water. Polymers can be split back into monomers by _____, where bonds are broken through the _____ of water.
10. Name the monomers (building blocks) that make up each of the following polymers:
 - Nucleic acids _____
 - Carbohydrates _____
 - Proteins _____
 - Lipids _____

11. Two examples of nucleic acids are _____ and _____. Protein _____ is very important to its function. The main function of carbohydrates is _____.

12. _____ enter chemical reactions and _____ are produced by chemical reactions. Energy is _____ or _____ when chemical bonds are broken or formed.

13. Enzymes are proteins that act as _____ by speeding up chemical reactions in cells without being permanently changed. They do so by lowering the reaction's _____ energy.

Chapter 7: Cell Structure and Function

14. Name 4 structures that are found in ALL cells.

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15. Unicellular organisms like bacteria that lack a **nucleus** are called _____. Protists, fungi, plants, and animals are considered _____ because their DNA is enclosed within a **nucleus**.

16. The control center of the cell that contains most of its genetic information is the _____. Chemical energy from food is converted into ATP during respiration in the _____.

17. Proteins are produced at the _____. The internal membrane system that transports lipids and proteins is called the _____. The _____ modifies, sorts, and packages proteins and lipids.

18. The _____ supports, shapes and protects prokaryotic and plant cells (but is not found in animal cells). The selectively permeable barrier that regulates what enters and leaves ALL cells is the _____. It contains a _____ layer of phospholipids.

19. Diffusion is the movement of a solute from _____ to _____ concentration and therefore does NOT require _____. The diffusion of water across a selectively permeable membrane is called _____. Active transport moves materials from _____ to _____ concentration and therefore DOES require _____.

20. In a/an _____ solution, the concentrations of solutes and water are the same on both sides of the cell membrane, so the cell neither swells nor shrinks. In a/an _____ solution, there is a lower concentration of solutes and a higher concentration of water outside the cells, so water moves _____ the cell. In a/an _____ solution, there is a higher concentration of solutes and a lower concentration of water outside the cells, so water moves _____ of the cell.

21. Explain the difference between endocytosis and exocytosis.

22. In more complex multicellular organisms, cells are organized into _____, which are organized into _____, which are organized into _____.

Chapters 8 and 9: Photosynthesis and Respiration

23. The reactants of photosynthesis include _____, _____, and _____ while the products include _____ and _____.
24. The reactants of respiration include _____ and _____ while the products include _____, _____, and _____.
25. _____ occurs in plants, algae, and some bacteria, but _____ occurs in nearly all living organisms.
26. In which organelle does each of the following energy conversions primarily occur?
- Photosynthesis _____
 - Cellular respiration _____

Chapter 10: Cell Growth and Division

27. Genetically identical offspring are produced from a single parent in _____ reproduction. In _____ reproduction, cells from 2 parents unite to form the first cell of a new organism.
28. Somatic, or body cells, are considered _____ because they contain 2 sets of chromosomes and are formed by _____. Reproductive cells are considered _____ because they contain 1 set of chromosomes and are formed by _____. Programmed cell death is called _____.
29. _____ is the division of the cytoplasm. The chromosomes are copied during the _____ phase of interphase.
30. Write the phases of mitosis in the correct order.
- 1.
 - 2.
 - 3.
 - 4.
31. In mitosis, the longest phase is _____ and the shortest phase is _____. The nuclear envelope breaks down during _____ and reforms during _____. Chromosomes line up in the middle of the cell during _____, and the chromatids separate and move toward the centrioles at each end of the cell during _____.
32. Identical copies of the same chromosome are called _____. Chromosome pairs in meiosis are called _____. The exchange of homolog parts is called _____.
33. Meiosis mixes up trait combinations, providing genetic diversity. As a result, which of the following are produced at the end of Meiosis II? (circle the correct choice in EACH row)
- 2 or 4 cells
 - Identical or nonidentical cells
 - Haploid or diploid cells

Chapter 11: Genetics

34. The “father of genetics” was _____, as he demonstrated the inheritance of certain traits in pea plants. The _____ allele is expressed when present in one copy, while the _____ allele’s expression can be masked by another allele.
35. _____ individuals have 2 different alleles of a gene while _____ individuals have 2 identical alleles of a gene. The allele combination in an individual that causes particular traits or disorders is called its _____ and the expression of a gene in traits or symptoms is its _____.
36. A monohybrid cross results in a phenotypic ratio of _____ while a dihybrid cross results in a phenotypic ratio of _____.
37. Inheritance in which both alleles are fully expressed is called _____. Inheritance where neither allele is dominant, resulting in a “blending” of alleles, is called _____.
38. Inheritance in which a gene has more than 2 **alleles** is classified as having _____. A trait controlled by 2 or more **genes** is considered _____.
39. If a heterozygous tall plant is crossed with a short plant, what percentage of the offspring will be short?

Chapter 12: DNA and Chromosomes

40. The current 3-D double helix model of DNA structure was proposed by _____ and _____. A chromosome chart that shows the diploid set of chromosomes is called a/an _____.
41. What are the 3 components of a nucleotide (which are the building blocks of nucleic acids)?
- -
 -
42. Which of the following is true regarding DNA? (circle the correct choice in EACH row)
- Single stranded or double stranded
 - Strands are complementary or identical
 - Strands are parallel or antiparallel
 - Replication is conservative, semiconservative, or dispersive
43. In DNA, the base thymine forms a complementary base pair with _____ and the base cytosine forms a complementary base pair with _____.
44. Normal human diploid zygotes contain _____ total chromosomes. A typical female’s sex chromosomes are _____ while a male’s are _____. Trisomy 21 is also known as _____.
45. _____ is when homologous chromosomes do not separate properly, resulting in an abnormal chromosome number. This error occurs in _____ of meiosis.
46. An extra copy of part of a chromosome is known as a/an _____, and the loss of part of a chromosome is called a/an _____.

Chapter 13: RNA and Protein Synthesis

47. The structure of DNA is _____ stranded while RNA is _____ stranded. The sugar found in DNA is _____ and the sugar found in RNA is _____.
48. While both DNA and RNA contain the nitrogenous bases adenine, guanine, and cytosine, DNA contains the nitrogenous base _____ but RNA contains _____ (which forms a complementary base pair with adenine).
49. RNA's _____ pairs with DNA's guanine. RNA's _____ pairs with DNA's cytosine. RNA's _____ pairs with DNA's thymine. RNA's _____ bonds with DNA's adenine.
50. The synthesis of RNA from a DNA template is called _____. The conversion of mRNA into the sequence of amino acids of a protein is called _____. In eukaryotes, transcription occurs in the _____ and translation occurs in the _____ at _____. _____ do not have a nucleus, so both transcription and translation occur in their _____.
51. A group of 3 nucleotide bases in mRNA that specifies a particular amino acid is called a/an _____. A group of 3 bases on tRNA that is complementary to mRNA and carries the appropriate amino acid is called a/an _____.
52. A change in the genetic material of a cell that alters a DNA sequence is called a/an _____. They may be harmful, beneficial, or have no effect on the organism.
53. Frameshift mutations such as _____ and _____ shift the reading frame of a genetic message. However, if bases are inserted or deleted in multiples of _____, the reading frame is not altered.
54. In a _____ mutation, only one amino acid is altered. In a _____ mutation, the protein is shortened because the new codon is a STOP codon. In a _____ mutation, there is no change in the amino acid sequence because the third base of the triplet was altered to a codon that specifies the same amino acid.

Chapter 15: Genetic Engineering

55. The continued breeding of individuals with similar desirable characteristics is called _____. The crossing of dissimilar individuals to bring together the best traits of both organisms is called _____.
56. DNA produced by combining DNA from different sources is called _____. It is used to produce _____ organisms, which contain genes from different species.
57. Genetically identical organisms are grown from a single adult cell by _____. Replacing an absent or faulty gene with a normal working one is called _____.

Ecology Unit

58. Living components in the environment are called _____ factors, and include other organisms like predators, food sources, and competitors. Chemical and physical components of the environment are called _____ factors. Examples of these nonliving factors include sunlight, _____, _____, pH, _____, and soil type.

59. A/an _____ is a group of similar organisms that can breed and produce fertile offspring. A/an _____ is a group of different, interacting species that live in the same area. A/an _____ is a group of individuals of the same species that live in the same area.

60. The _____ has soil that is thin and nutrient poor, is hot and very wet, and is home to more species than all of the other biomes combined. The _____ also has thin, nutrient poor soil, but is very dry with hot days and cold nights.

61. The biome where we live that has fertile soil and deciduous and coniferous trees is the _____. The other biome with fertile soil but has lots of lush grasses is the _____. The _____ has thin soil that is perpetually frozen and has long, cold dark winters with strong winds.

62. Wetlands formed where a river meets the sea are called _____.

63. _____ feed only on plant material. _____ feed only on other animals. _____ feed on both plants and animals. _____ feed on dead and decaying plant or animal material.

64. Give 2 examples of primary consumers: _____ and _____

65. All food chains and webs must start with _____, which make their own food by capturing energy from sunlight or chemicals. Only _____% of the energy consumed by an organism is passed through each trophic level from one organism to another.

66. The general place where an organism lives is its _____. The range of conditions in which the organism lives and the way it uses those conditions is called its _____.

67. A species whose role is essential for the survival of many other species in an ecosystem is called a/an _____ species. Species _____ leads to ecosystem stability

68. Ticks and fleas are examples of _____ because they take nutrients from a host. A relationship in which one species benefits and the other is neither helped nor harmed is called _____. Flowers and bees exhibit _____ because both species benefit from the relationship.

69. In logistic population growth, the population stabilizes at its _____, or the maximum number of individuals of a species that can be supported by that environment.

Evolution Unit

70. An inherited characteristic that increases an organism's ability to survive and reproduce in a certain environment is called a/an _____. They can involve structures, functions, or behaviors but NOT _____ characteristics, as the latter can NOT be inherited.

71. The process by which organisms that are most suited to their environment survive and reproduce is called _____.

72. _____ structures are similar structures in different species of common ancestry, like the front limbs of vertebrates. _____ structures have a common function but differ in structures, like the wings of insects and birds. _____ structures are inherited from ancestors but lost much or all of their original function.

73. Evolution involves a change in the frequency of alleles in a _____ over time. A random change in allele frequency is called _____.

75. In _____ isolation, two populations are separated by geographic barriers like mountains or water. In _____ isolation, two populations develop differences in courtship rituals. In _____ isolation, two or more species reproduce at different times.